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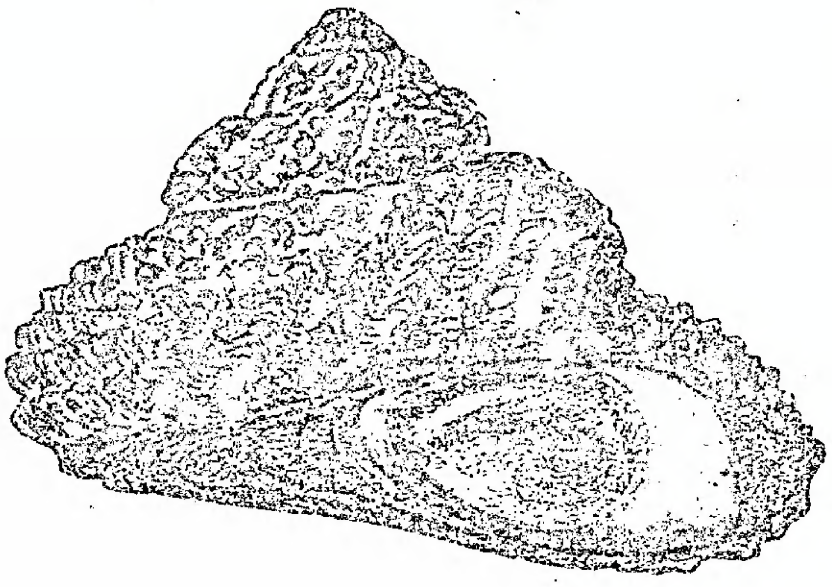

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RHYTIDA GREENWOODI (GRAY, 1850)

P.R. Jamieson

The type species of the Genus Rhytida was first described by Gray in 1850 as Helix greenwoodi, and Powell later described several related species and subspecies; Rhytida stephenensis Powell (1930); R.spelaea Powell (1933); and R.greenwoodi webbi Powell(1949). All were very close to R.greenwoodi typical. Subsequently Parkinson (1970) showed R.spelaea to be a synonym of R.greenwoodi, and Powell (1979) relegated R.stephenensis to a subspecies of R.greenwoodi. Consequently three subspecies are now recognised and each will be discussed below.

Rhytida greenwoodi greenwoodi (Gray, 1850). Figs 1 and 2.

Description: Typical R.greenwoodi is coloured fuscous to olive green, and has rounded whorls with a somewhat depressed spire. The sculpture consists of radial anastomosing wrinkles and 4-5 oblique spiral ridges that develop over the periphery of the body whorl. The strength of these spiral ridges varies in individuals, but they never extend onto the dorsal surface to any extent. The most interesting feature of this subspecies is the presence or absence of a dark chestnut umbilical region (see Discussion). Major diameter 28mm.

Distribution: Type locality, Auckland. Recorded from just north of the Auckland Isthmus (Muriwai and Waitakere Ranges) to Wellington. Also at some offshore localities, including Waiheke Is, Great Barrier Is, Cuvier Is, Koruenga and Ohena islands, the Mercury islands, Ruamahua Is, and the Alderman islands.

Habitat: Prefers scrubby bush fringes, especially under bracken fern.

Discussion: Shells from the type locality and general vicinity have the dark umbilical patch very prominent, whereas most records south of there are entirely olive green. The exact distribution of the dark form is somewhat confusing. It has been recorded from as far south as Raglan, and east to the south-western aspects of the Coromandel Penninsula (Thames and Te Puru). Powell (1949) recorded specimens from Taupiri Mountain, near Huntly, as having dark bases, but specimens from that locality in the National Museum are pale. He also recorded several mixed colonies where specimens had either a pale or a dark umbilicus, such as at Midhurst, Taranaki. This record would need substantiating, as other Taranaki populations, and those further north towards Waitomo, all have pale bases. The south-west Coromandel populations are composite colonies, or have only slightly darkened bases. Obviously both forms have merged in this area, but pale-based shells have found their way north to Cape Colville, Cuvier Is, and Great Barrier Is. More records from the south Auckland/northern Waikato region need to be examined to fix any distributional boundaries between these two forms. Specimens from Cuvier Is are somewhat more rotund than, say, specimens from linestone areas, which are more depressed and thicker shelled.

Rhytida spelaea Powell (1933) was described from 3 sub-recent specimens from sand dunes south of Cape Kidnappers. These shells differed from the typical form in minor details (more inflated, and with a rounded base) but these were shown by Parkinson (1970) to be ecotypic characteristics.

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R. spelaea was therefore placed in synonomy with R.greenwoodi greenwoodi. Other similar sub-recent shells have been recorded from Portland Is, Wainui Beach near Gisborne, and Ocean Beach south of Cape Kidnappers.

Rhytida greenwoodi webbi. Powell 1949. Fig 3.

Description: Colour dark red-brown above, the base yellowish to slightly greenish pale brown, without a dark umbilicus. Other distinguishing reatures are the more depressed spire and vertically compressed whorls. The oblique spiral ridges are obsolescent. Major diameter 30mm.

Distribution: Type locality - Clifton, Takaka. Originally known only from the type locality, further records now include the west side of Takaka Hill, Motupipi, a track to Rawiti Cave, Elliots Cave, east Takaka (Subfossil), and near the Tarakohe Cement Works. All these localities are in a restricted area bordering the western aspect of the Pikikoruna Range.

Habitat: Under Astelia and in crevices amongst limestone buttes at Clifton and Motupipi; deep down under rock piles covered with creeping vegetation on the west side of Takaka Hill.

Discussion: Although always regarded as rare, I have found it to be common on the west side of Takaka Hill. It is also making a comeback at Motupipi. Its restricted distribution and the scrubby nature of its habitat make this subspecies very prone to local burnoffs. The small colonies need some form of protection to prevent them from being destroyed.

Rhytida greenwoodi webbi seems to be more closely related to greenwoodi typical than to the other South Is species, R.g.stephenensis It seems probable that this isolated form arose from greenwoodi stock migrating across from the North Is (perhaps along with Powelliphanta hochstetteri hochstetteri) when a land bridge connected the North Is with the northern tip of the Pikikoruna Range (see Climo, 1978). Subfossil shells identical to R.g.stephenensis have been recorded from two cave deposits near the summit of Takaka Hill (the "snail pot" and Hawkes Cave), however, R.g.stephenensis appears to have become locally extinct in this region, or perhaps replaced by the more recent invasion of R.g.webbi. Specimens from the west side of Takaka Hill are slightly larger than elsewhere and some specimens show a distinctly darkened umbilical region, though this never reaches the prominence of Auckland R.g.greenwoodi. The oblique spiral ridges are also more numerous (up to 10).

Rhytida greenwoodi stephenensis. Powell, 1930. Fig 4.

Description: Colour olive green. Larger than greenwoodi typical, with a major diameter of 37mm (subrecent, Takaka Hill), and 34mm (Stephens Is and Maud Is). This subspecies has looser coiling and greater acceleration of the last whorl, the spiral ridges extend strongly onto the dorsal surface, and the umbilical region is without a dark patch.

Distribution: Type locality, Stephens Is, off the northern tip of D'urville Is. Shells have recently been collected from a number of other islands in the Marlborough Sounds, including Outer Chetwode Is, Maud Is, Motuora Is, and Motu Ngaratiti Is. Other shells which compare more closely to this subspecies rather than greenwoodi

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typical have been recorded from a number of coastal Marlborough localities and down at least to the Kaikoura Penninsula. A further record (subrecent?) from the lower Waipara River, North Canterbury, needs substantiating. Subrecent shells identical to recent ones have been recorded from cave deposits on Takaka Hill, considerably to the west of present records (see above).

Habitat: On Stephens Is this form shows a distinct preference for beneath clumps of grasses. Marlborough specimens can be found under ferns and flax, usually on rubble slopes, and often right on the roadside and away from any bush areas.

Discussion: Coastal Marlborough specimens are identical in all respects to R.g.stephenensis, except they are smaller (up to 32.5mm dia.). Some specimens from Maud Is have a distinctly darkened umbilicus, but never as prominent as Auckland R.g.greenwoodi.

The presence of subrecent shells on Takaka Hill suggests a formerly much wider distribution for this subspecies, now existing only in isolated pockets. I know of no records from D'urville Is nor mainland Marlborough, despite the close promixity of some of the island habitats.

Acknowledgement

I wish to express my thanks to Dr Frank Climo for allowing me to examine all the material in the National Museum.

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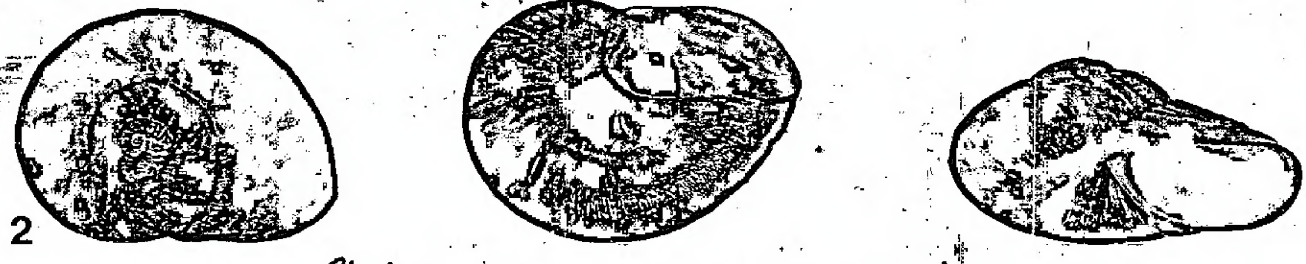
Rhytida greenwoodi greenwoodi. Manukau.



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Rhytida greenwoodi greenwoodi. Levin.

3

Rhytida greenwoodi webbi. Nelson.

4

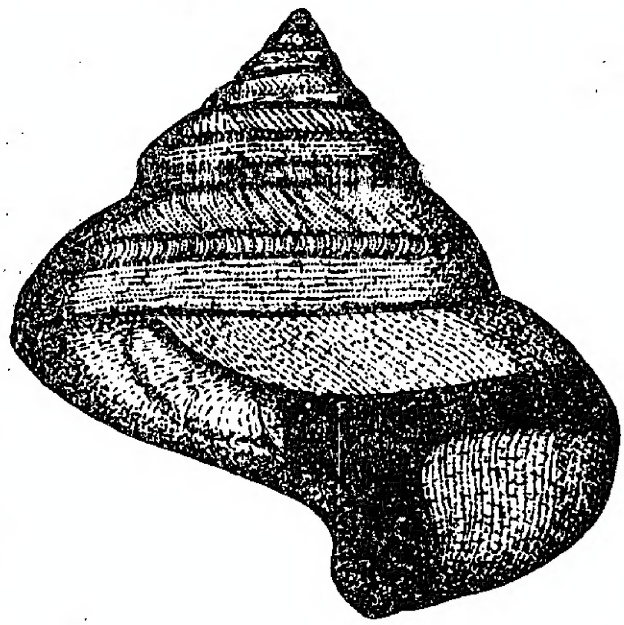
Rhytida greenwoodi stephenensis. Kaikoura.

1 cm

A LIVING PLEUROTOMARIID SLIT SHELL FROM THE SOUTH PACIFIC

K.R. Grange

Recent species of the rare, deep water gastropod family Pleurotomariidae have been previously recorded only from south-east Asia and the western Atlantic, although there have been fossil pleurotomariids found in the Australasian region. Two living species of Perotrochus have now been collected from deep water in the South-west Pacific and recently described by Bouchet & Metivier (1982). While aboard RV Tangaroa on a biological research cruise to the Minerva Reefs in 1980, I was lucky enough to collect one of these, the holotype of Perotrochus tangaroana. It was dredged live between 547 & 646 m on a pumice sand substrate on the Lau Ridge, south-east of Fiji, and is deposited in the N.Z. Oceanographic Institute collection, Wellington. Another specimen, a juvenile, in the National Museum, has been collected from 841 m on the northern Three Kings Rise. The second species described by Bouchet & Metivier (1980) is P.Caledonicus, collected between 390 & 395 m depth, south-west of Ile des Pins, southern New Caledonia, in 1978.



Perotrochus tangaroana. Bouchet & Metivier, 1982

The shell of Perotrochus tangaroana is quite large (height 58.5mm; diameter 69.0mm, pale reddish pink, and slightly irridescent. The shell surface is sculptured with oblique spiral threads above the selenizone and numerous axial chords below. The selenizone itself is bordered by two raised lines and is sculptured with close-set, backward curving incremental growth lines. The slit is relatively short, about one-sixth the length of the body whorl, and has sharp, straight edges. The base is moderately convex and rosy cream with reddish markings and numerous spiral striae.

The Pleurotomariidae is the most primitive family of the gastropods, and together with Haliotidae, Scissurellidae, and Fissurellidae make up the superfamily Zeugobranchia, all members of which have paired gills, Currents used in respiration cross the gills towards the mid-line of the mantle where the shell and mantle cavity have been secondarily opened so that these exhalent currents and the faeces may pass out more directly. This opening in the shell shows a gradual decline as one goes from the primitive to the more advanced members of the group. In the Pleurotomariidae and Scissurella, the body whorl of the shell is opened by a long slit as far back as the anus. In the slit limpets (Emarginula) the slit is retained only in the front of the shell, while in Haliotis the opening has become a row of separate holes. The next stage is found in keyhole limpets where the slit is closed to leave a small hole at the tope of a volcano-like shell, and in the final stage the opening is closed completely, as in Scutus, but a faint trace remains as a small groove under the front of the shell.

Perotrochus tangaroana is at least as impressive as the better known and keenly sort after pleurotomariid species such P.hirasei or Midadotrochus schmalzi from Taiwan and Japan. To collect a large, living specimen close to home was a great thrill and one of the highlights of the entire cruise.

Reference

Bouchet, P.; Metivier, B. 1982: Living Pleurotomariidae (Mollusca: Gastropoda) from the South Pacific. N.Z. Journal of Zoology 9:309-318

ALBINOISM RECORDED WITHIN THE LAND SNAIL SUTERIA IDE (GRAY, 1850)

B. Hazelwood.

I have been shown recently specimens of Suteria collected from the Bushy Park Reserve, Wanganui, by Pauleen Mayhill of Hamilton. Suteria ide appears to be very prolific in this area. Typical specimens display a dark streaked colour pattern and the ribbing (a feature of Suteria) is wavy in contour. The most striking feature, however, is that the shell is completely covered with long hairs.

Amongst specimens collected were a number of albino shells. These look like a different species, having no hairs at all, no colour pattern, and are uniformly cream in colour. These specimens glisten and are exceedingly beautiful.

Unfortunately I did not see the animals alive so have no information on whether there were any differences in pigmentation of the body, eyes, or other obvious characters. Apparently this observation corresponds to similar reports from overseas refarding albinoism and the absence of hairs on land snails.

TOPOTYPE COLLECTING ABOUT COOK STRAIT

W.J. Paul

An article in Cookia Vol 4(3), Oct 1981, placed emphasis on Lyall Bay as an important collecting locality, and on the value of topotypes (specimens from the type locality) in a collection, and gave a list of some species originally collected from Lyall Bay. Topotypes act as key specimens for correct identifications and comparisons with closely related species. One of the features of the Finlay collection (now in the Auckland Museum) which made it so valuable was that it contained, in his own words, "a practically complete topotypic suite of New Zealand fossil and living Mollusca".

Quite a number of species of shells have been originally collected from localities about Cook Strait. Members of the Wellington Shell Club have in recent times been extending their field trips to both sides of the Strait and in the course of these trips members may take the opportunity to search for the following species at the type localities listed and thus enhance the value of their collections.

Callochiton kapitiensis Mestayer 1926
Kapiti Is.

Acanthochitona zelandica (Quoy & Gaimard 1835)
French Pass, Nelson.

Craspedochiton rubiginosus (Hutton 1872)
Kapiti Is.

Haliotis virginea Gmelin 1791
Queen Charlotte Sound (locality nominated by Powell).

Cellana flava (Hutton 1873)
Amuri Bluff.

Thoristella chathamensis cookiana Powell 1939
Island Bay.

Diloma zelandica (Quoy & Gaimard 1834)
Tasman Bay, Nelson.

Maurea waikanae (Oliver 1926)
Waikanae Beach.

Eatoniella roseocincta (Suter 1908)
Titahi Bay.

Eatoniella lampra (Suter 1908)
Titahi Bay.

Notoscrobs incidata maoria Ponder 1968
Between Pukerua Bay and Paekakariki

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Conchiolepas albiceratus Ponder 1966
Between Pukerua Bay and Paekakariki.

Zeacolpus delli Marwick 1957
Wellington Harbour, 20 metres.

Larochella toreum Powell 1927
Houghton Bay.

Balcis titahica (Suter 1908)
Titahi Bay.

Uttleya marwicki Powell 1952
Tahunanui Beach, Nelson.

Thyasira peroniana waikanae Fleming 1950
Waikanae Beach

Ostrea charlottae Finlay 1928
Queen Charlotte Sound

Arthritica crassiformis Powell 1933
Maheno Bay, Wellington.

Alcithoe arabica (Gmelin 1791)
Porirua Harbour, (locality nominated by Weaver & Dupont).

Alcithoe fusus fusus (Quoy & Gaimard 1833)
Tasman Bay, Nelson.

Alcithoe swainsoni Marwick 1926
The type is a fossil from Kai Iwi, Wanganui, but Marwick commented that specimens agreeing with the type occurred in Wellington Harbour. They have been dredged between Somes Is and Eastbourne.

Duplicaria propelevis (Ponder 1968)
Waikanae Beach

Cylichna zealandica Kirk 1880
Waikanae Beach

Several species have also been named from the deeper waters of Cook Strait, but these have not been listed as general collectors would not have access to the localities.

BLIND EEL SHELL COLLECTING

D.W. Watson

Blind eels, or hagfish, have no eyes or jaws. They feed by sense of smell and rasp food such as dead fish with a series of teeth surrounded by a sucker-like mouth. Their repulsiveness is further enhanced by the fact that they are always surrounded by an enormous amount of slime which adheres to anything it touches, particularly when disturbed, as when caught on fishing lines.

From a set line placed in 180 ft of water off Kapiti Is recently, 10 blind eels were caught and it was noticed before throwing away these seemingly useless beasts that several shells had been caught up in the slime as they had writhed along the sea floor. In all, about 30 species of shells were collected, including Craspedochiton rubiginosus, Astrea heliotropium, Sigapatella novaezelandiae, Trichosirius inornatus, Glycymeris modesta, Chlamys zelandiae, Acar sandersonae, Modiolus areolatus, Cardita aotenana, Venerupis largillierti, Hiatella arctica, Maorimactra ordinaria, and a brachiopod.

HANDY HINTS

P.R. Jamieson

When removing the animal from a univalve, never tug on the animal itself, as this usually results in the animal breaking, leaving soft parts in the spire which are often impossible to remove and soon become very smelly. Instead, after the initial gentle tug, coil the shell in an anti-clockwise direction (i.e. with the spire pointed upward and the aperture facing you) in an attempt to uncoil the animal from the shell. Try to uncoil the animal out around the columella and siphonal canal, and, hopefully, you will get the animal out intact, if you are careful. Good luck!

Delicate bivalves with an even more delicate periostracum (eg Soletellina nitida) become a problem if you want to have the valves dried closed, in a natural position. If you use cotton to keep them closed the delicate edge of the shell and periostracum may be damaged. Instead try using some 1 cm wide adhesive tape. Place the non adhesive side onto the shell and wind around several times. The tape will stick to itself rather than the shell or periostracum, so it can be removed later without damage.

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AN ITEM OF INTEREST

An article in Cookia, Vol3(2), listed a number of generic names duplicated in both botany and conchology. It may be of interest to readers that the name Cookia has been used twice in botany, as well as the more familiar use in conchology!

The March 1980 issue of N.Z. Gardener stated that in 1782 a Frenchman, Sonnernt, described Cookia punctata from China. However, the species had already been described in another Genus so the name was lost. Then, in 1791, J.F. Gmelin described the N.Z. daphnes in the Genus Cookia. Of course by our modern rules this should not have been done as the name had earlier been used by Sonnernt. But the N.Z. daphnes were subsequently found to belong to an earlier described Genus Pimelea, so Cookia was again invalidated.

To overcome the fact that botany lacked a name validly attributed to Cook, an interesting new plant from New Caledonia was named in 1973 by Dr Bernardi as Captaincookia margaretae.

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A CLOSER LOOK AT THE CONE SHELLS FROM THE CAPE VERDE ISLANDS

P.R. Jamieson

Introduction:

Of all the popular groups of Mollusca, the family Conidae probably presents the greatest taxonomic problems. Comprehensive works on the family are few, the most recent being Walls (1979): "Cone Shells - a Synopsis of the Living Conidae". This extensive and beautifully illustrated text has gone a long way to establish some continuity in species names and recent nomenclatural changes. However, even Walls himself stated that his work was intended only as introduction to this complex family, and also to provide for the first time colour illustrations of the valid (in his opinion) species and subspecies. Unfortunately such a large family with such a wide distribution is apt to defy even the most careful worker, and there are errors in Walls' text, as he himself recognised as being quite probable. It is perhaps generally recognised that Walls has leaned somewhat conservatively and lumped several valid species together. The reasons for this are many. Firstly, many earlier descriptions were totally inadequate and so vague that they could apply to a number of species. This, often together with no locality data for type specimens, or type specimens being lost, has resulted in many earlier names now being recognised as "nomen dubium", and synonomies could easily apply to one of many species. Secondly, Walls had little material from some areas, and sometimes only photos of specimens were used for comparisons. Thirdly, relatively little is known about Conus population and distributions over wide areas. All these problems apply especially to the West African Coast, in particular the Cape Verde Islands.

Recently several books on cones have appeared, covering smaller regions in depth, and bringing to light some of the inadequacies of Walls publication. I have received one of tjese. "Cone Shells from Cape Verde Islands, a Difficult Puzzle", by D. Rockel, E. Rolan & A. Monteiro, from the second author. The following is basically a summary of that book, plus ideas from several smaller articles and personal communications on Cape Verde cones from E. Rolan. His diving in the Cape Verde Islands and many more hours of study and evaluation. Hopefully this has lead to more sound evaluations than those of Walls. I will draw special attention to those areas in Walls that need correction, and give some account of the species occuring in the Cape Verde Islands.

The Cape Verde Islands lie about 800 km west of Senegal, West Africa (Fig. 1.). They comprise 10 major islands, plus a number of small islets. The islands are volcanic in origin, and were formed in the Jurassic period as submarine volcanic activity, reaching the surface in the Miocene. They were colonised by Portuguese sailors in the 15th century and remained under Portuguese administration until recently, when they became independent country - the Republic of Cabo Verde.

The islands have been almost completely ignored, in a malacological sense, apart from a few papers on some endemic species, and even today a large proportion of its fauna is unknown. Since 1975 interest has increased in the malacological aspects, and workers visiting the islands have been surprised by the exurburence of the Conidae. At certain places they completely dominate all other molluscs. This rich fauna comprised several endemic species and forms, which prompted a small book "Seashells from Cape Verde Islands" by L. Burnay and A. Monteiro (Lisbon, 1977). In the 3 years following that publication, the Cape verde Is cones have received special attention by a number of people, prompting the publication of a book solely on Cape Verde Is cones which presents a summary of research to date and hopefully will be used as a basis for further studies.

General Characteristics of Cape Verde Islands Conus species

Three features predominate -

1. The dominance of this family in many locations.

2. The existence of a number of endemic species and forms, together with the absence of several species common on the mainland.

3. The extreme variability of specimens within each recognised species.

Some reasons for these features can be readily pointed out, such as strong ocean currents which run between the islands and the mainland, but more complete explanations are needed.

Several distinct populations have been found for some species, usually in a particular bay. This has lead the authors to believe that evolution is at work under their very eyes! They consider the Cape Verde Islands could turn out to be an impressive example of an area which is undergoing archipel speciation (and which has also occured at Galapagos, Hawaii, and Madagascar) which motivated some of Darwin's work on evolution. However, this does not account for the fact that a large amount of variability exists within one small island or group of islands, whereas in other regions many Conus species show little variation over thousands of kilometers. This may be due to planktonic larval dispersal, but this has not been investigated, as yet.

Another feature to note is the extremely limited zones that Cape Verde Island cones occupy, such as in rock crevices, under sea urchins, stones, etc. Through the generations, protective colouration has developed to disguise the shells against the background, and in some cases this is extremely specialised. This further emphasises the strong limitations of the habitat conditions suitable for each population. These populations thus have a very small capacity for dispersion and each species can become confined to little more than one small bay. Although these colour patterns are characteristic and fairly constant in each distinct population, the species as a whole exhibits a great deal of variability.

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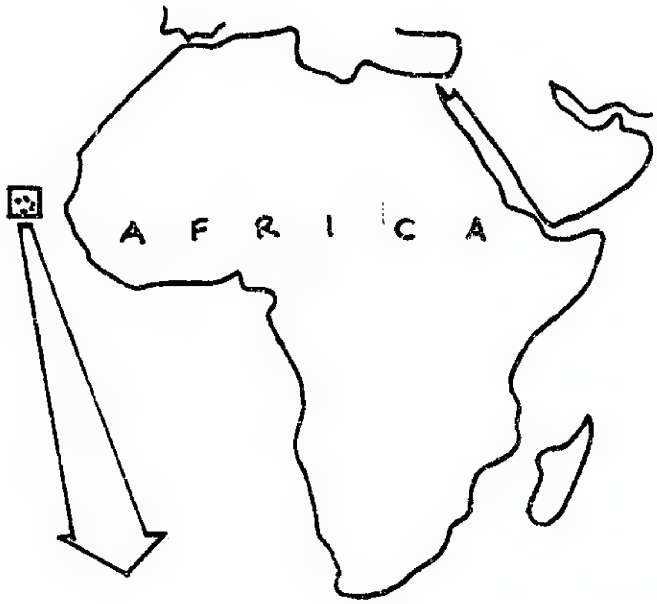
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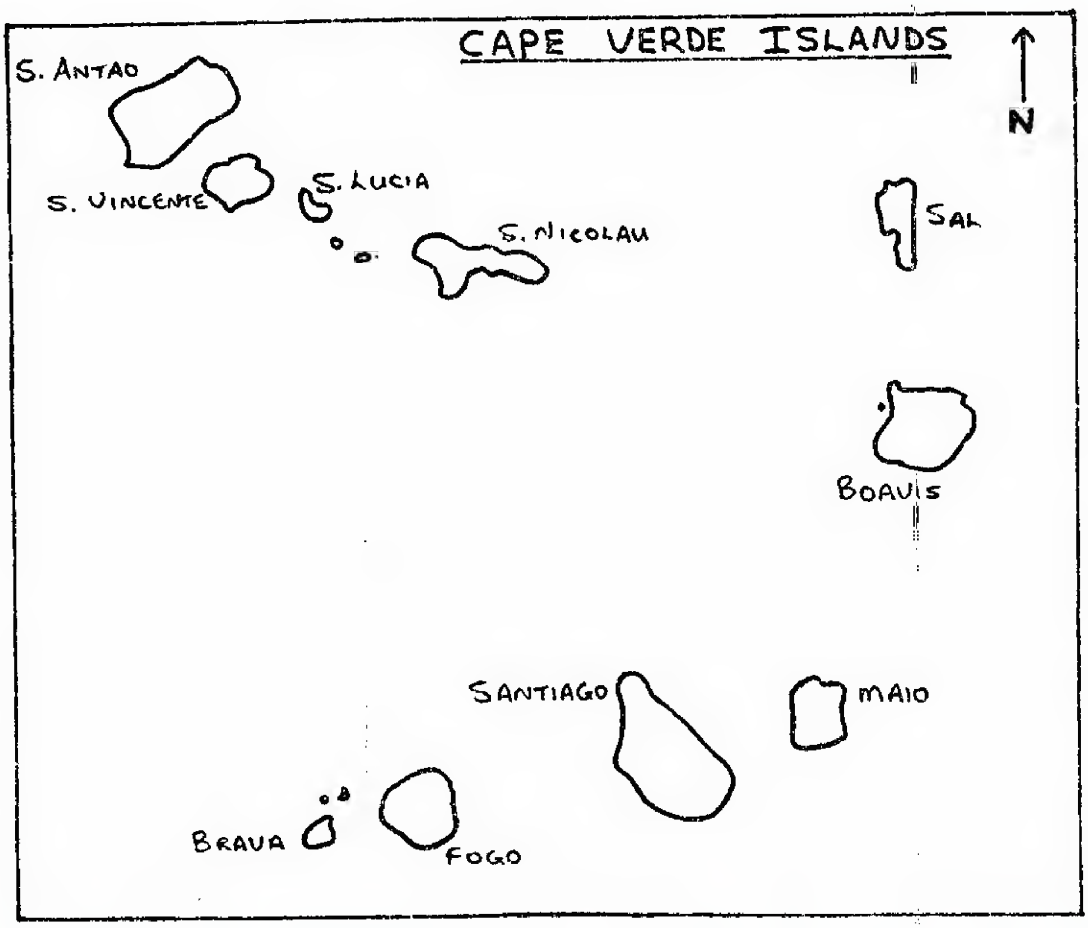
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Species Separation Problems:

The most striking features of the many thousands of specimens studied were -

1. High number of groups or populations with similar characteristics.

2. Limited range of each indiviudal population.

3. Absence of intergrading among populations, even if obviously related to some extent.

4. Ranges of two or more populations sometimes overlapping.

5. Constancy of colour and pattern within each population.

This infers that the Conus populations under study disperse very little; they appear to colonise relatively close to the parent population. If this is so and each population is practically isolated, it is reasonable to believe that evolution is heading towards the establishment of many distinct, valid, species.

The authors consider themselves neither "lumpers" for the sake of it, nor, on the other hand, are they willing to create large numbers of new taxa of little real significance. Therefore, they have allowed a high degree of variation within a given species, especially if that variation reflects different localities. They have also stressed the presence of two or more populations in the same territory, with no intergrading of clearly distinctive features, as any important point towards consideration of distinct species.

Non Endemic Species:

There are three non-endemic species occuring in the Cape Verde Islands - Conus genuanus Linnaeus, 1758; C.ermineus Born, 1778; and C. tabidus Reeve 1884.

Conus genuanus (Plate 2). Description adequately covered by Walls, though it should be noted that specimens from the Cape Verde Islands are generally much smaller than those from mainland Africa. Largest observed Cape Verde specimen = 56.3mm in length, average 40mm. Recorded from Senegal to Angola, and generally distributed throughout the Cape Verde Islands. It lives usually buried in sand or under rocks in groups of three or more, at a depth of 1 - 5m. When alive the animal is coloured bright red to pink.

Conus ermineus (Plate 1.) A highly variable species, as outlined by Walls. The animal has a reddish foot and siphon. Recorded from Senegal to Angola, also the Gulf of Mexico to northern Brazil, and almost everywhere in the Cape Verdes. It lives buried in sand under rocks, odten in groups of 4 or more. It is known to feed on fish, and its poison is strong enough to cause injury to man.

Conus tabidus (Plate 3). This species has been erroneously identified in the past as C.ambiguus Reeve 1844. It has been established that the name C.ambiguus should apply only to a population living in Senegal. C.griseus and C.gernati are synonomies of C.ambiguus, while the Cape Verde population is, in fact, C.tabidus. Shell with a straight to slightly convex spire, externally white or light yellow. Entire body whorl with spiral grooves, more prominent at the anterior end. Spire colour same as body whorl, but it often has dots and stripes near the suture. Lip thin, straight and parallel to columella, interior of aperture milkish white. Periostracum brown and thick,

living animal bright red. Average size 29mm x 15mm, largest observed specimen 42.1mm in length. Lives in a variety of habitats such as under rocks on sand, on algae, and in rock crevices. Most abundant on the island of Sal, but never on many of the other islands. Two distinct forms have been found -
Form A: the typical form, present at most localities. It has a rounded shoulder and high spire with slightly convex whorls which are sometimes slightly stepped.
Form B; recorded from S. Vicente (Mindelo), and living in mud. It has a straighter profile, darker periostracum, almost violet animal, and an angular shoulder. The spire is very low, with a definate concave profile.

Endemic Species:

Let us now turn to those Conus species that are endemic to the Cape Verde Islands. These can be divided into 5 groups, each formed from several closely related species, or at least species presenting some morphological similarity.

1. The "venulatus" complex, containing the 3 species - Conus venulatus, Hwass & Bruguire 1792; C.arteralbus Kiener 1849; and C.trochulus Reeve 1844. Walls considered all 3 species to be synonomous with C.venulatus, but further evidence suggests that all 3 are valid. Because of the confusion, each species shall be described in detail.
Conus venulatus (Plates 4, 10).

Synonyms: C.nivosus Lamarck 1810; C.nivifer Sowerby 1833. Dimensions: length 30-45mm, width 18-25mm. Largest observes specimen 60x37mm. Shell with convex profile, usually white or bluish ground colour, covered with darker irregular blotches ranging from yellowish brown to dark brown, sometimes violet or orange, rarely a bluish ground colour covered with white elongated dots. The spire is overlaid with dark undulating blotches and is rather short and has a gently concave profile which is often eroded in adults. Suture well marked, spire whorls with 2-3 spiral grooves. Aperture white to purplish with darker zones in the posterior; lip very slightly concave. Animal purplish to pink. It lives on sandy bottom at 1 - 4 metres, amongst (or sometimes under) stones. It lives with C.trochulus on Boavista Island and C.ateralbus on Sal Island. Three distinct forms can be recognised.

(i) Form A. this is typical C.venulatus. Ground colour white, but covered by dark brown to grey or violet blotches forming a regular network and giving the shell a dark appearance. Known from Boavista Is (Sal Rei & Gatas Bay) & Maio Is.

(ii) Form B. Pale coloured with a whitish central band, and the remaining area of the body whorl various shades of brown. Found on Boavista Is (South of Sal Rei) and Sal Is (Serra Neyra & Mordeira).

(iii) Form C. This form corresponds to the description of C.nivifer Sowerby. The pattern differs significantly from the other forms, consisting of short, interrupted spiral lines on a blueish background. These lines are usually light or dark brown. The aperture is purple. Found at Gatas Bay, Boavista Is, and possibly could be thought of as a valid subspecies, C.venulatus nivifer Sowerby.
Conus ateralbus (Plate 6). Dimensions: length 20-35mm (but up to 51mm), width 13-20mm. The shell has a straight profile, and is black with several white roughly rectangular blotches forming a spiral band about mid-body. Occasionally other scattered bands or blotches are present. Spire black, with regular white dots, but is usually badly worn in adults. In young specimens the spire whorls have a clearly marked suture and obsolete spiral grooves. Aperture thin, and the slightly convex lip is purple. Penostracum smooth, thin, and light

brown. Animal violet, with an almost black siphon. It lives 0.5 & 3m deep, amongst algae on rocks, or buried in rock crevices covered with a green algae. Found only on Sal Is, in Algodoero and Mordoira Bays.

This is an outstandingly beautiful species, sought after by collectors. It is rare with an extremely restricted habitat and geographical range. Most specimens are badly damaged by calcareous incrustration. Probably no more than 1000 individuals have ever been collected and the total living population at any one time would not exceed 1000. Naturally, over-collecting could easily lead to its extinction.

The consideration of C.ateralbus as a distinct species has been quite controversial, despite the extreme accuracy of Kiener's original illustration. It has been referred to as a synonym of C.venulahis however, it is extremely constant and typical C.venulatus have recently been found living sympatrically with C.ateralbus, with no intergrading. This would support its specific status.

Conus trochulus (Plate 8). Dimensions: length 20-35mm (but up to 51mm), width 13-20mm. This is the most constant of the 3 species. The shell is always a light violet, elongated, with a short convex spire. The lip is thin and straight. Animal pink to purple, tip of siphon light violet. It lives bured in sand between rocks. It is known only from Sal Rei on Boavista Is where it co-exists with C.venulatus, but does not intergrade.

2. The "borgesi" complex, containing 2 species - Conus borgesi Trovao 1979, and C.decoratus Rockel, Rolon, Monteiro 1981.

Conus borgesi: Average size 26mm x 15.5mm, the largest observed specimen has been 35mm in length. The shell is thick, very slightly pyriform, and smooth except for some spiral grooves at the anterior tip. Shoulder broad and angular, body whorl ivory white, with a superimposed pattern of brown wavy lines, generally thin, but sometimes broad. The anterior third of the body whorl is brown but the remainder is almost devoid of pattern. Spire low to very low, the whorls with 2-3 spiral striae and the colour matches the body whorl. Aperture white, the lip is thin and slightly convex, and its inner edge is bordered by a brown line. The periostracum is thin and yellowish. Animal dark red to almost black.

Found on Boavista Is (Catas Bay), as well as Maio, Brava, and Santa Lucia Islands, living under stones in depths of 2-5 m, although reported to 40m by Trovao.

Conus decoratus (Plates 9, 12). Average size 23mm x 13mm, the largest observed specimen has been 34.7mm in length. The shell is slightly convex and black with many irregular white blotches usually forming a definate central spiral band. These blotches sometimes form zigzag lines. The anterior tip is often devoid of white but has several indistinct spiral grooves, while the rest of the body whorl is smooth. The spire is moderately high, convex and the whorls are spirally , although usually worn in the adults. The shoulder is rounded. The lip is thin, slightly convex, and with the inner edge bordered in black. The aperture is bluish with a darker almost purple shade towards the interior. A small light coloured band interrupts the black lip below the centre, corresponding to the external band of white blotches. Animal light to dark red, sometimes violet. Found on dark sand amongst rocks in depts of 1-3m at Makota on Santa Vilcente Is.

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Other populations have been found which are considered forms of the one variable species - form A, the typical C.decoratus; form B, as above but with shades of brown instead of black, and occurs on Santa Lucia and Sao Vilcente (Saragasa & Calhau); form C, light honey brown with several zigzaging white blotches and found on Maio Is; form D, light brown with vaguely triangular white dots, found at Curral, Santa Lucia. Overall, form B resembles C.borgesi and forms C and D are reminiscent of C.cuneolus, but their shape and profile place them within the variation of C.decoratus. Further research is needed to clarify the identity of these forms.

3. The "josephinae" complex, containing 2 species - Conus josephinae Rolon, 1980 and Conus fuscoflavus Rochel, Rolon, Monteiro, 1981.
Conus josephinae (Plate 11). Average size 25.8mm & 15.4mm, largest observed specimen 31.1mm in length. A solid shell, slightly pyriform with a rounded shoulder and slightly concave spire. Young specimens have a couple of grooves in the spiral whorls but these are often absent in adults. The body whorl is a solid dark brown in most specimens but occasionally some lighter shades of brown may occur, forming spiral lines or narrow bands. In a few examples the body whorl has several irregular white blotches. The aperture is white and the periostracum very thin. The living animal is dark red, sometimes almost purple. It lives on rocks covered with algae, or in pools exposed during low tide. It is found at Sal-Rei on Boavista Is.

This species has occasionally been called C.miser Boivin 1864, but this must be considered "nomen dubium", making C.josephinae the valid name. This species is readily separated from all others by a combination of shape, and colouration of the external shell and aperture, and is certainly not C.mercator as outlined by Walls (1979).
Conus fuscoflavus. Average size 23.2mm x 13.6mm, largest observed specimen 26.1mm in length. A pyriform shell, horny yellow and totally devoid of pattern. The anterior end and first post-embryonic whorls are constantly dark brown, and the body whorl is smooth, except for several spiral grooves near its anterior end. These spiral whorls contain two extremely shallow spiral striae which can be seen only under magnification. The aperture is white apart from a purplish brown dot deep inside on the middle position, and the lip is bordered with yellowish brown. This species lives sympatrically with C.josephinae at Sal-Rei, Boavista Is and the two are readily separated by the unique colouration and angular shoulder of C.fuscoflavus.

4. The "ventricosus" complex, containing 7 species and subspecies related to Conus ventricosus which occurs in the Mediterranean Sea and the southern and Atlantic coasts of Portugal - Conus crotchii Reeve, 1849; C.iberogermanicus Rochel, Rolon and Monteiro, 1981; C.grahami grahami Rockel, von Coel and Burnay, 1980; C.g.pseudoventricosus Rockel, Rolon & Monteiro, 1981; C.g.longilineus Rockel, Rolon & Monteiro, 1981; C.damottai Trovao, 1979; and C.miruchae Rockel, Rolon & Monteiro, 1981.
Conus crotchii (Plate 7). (Synonym: C.irregularis Sowerby, 1857)
Dimensions: length 15-35mm, width 11-17mm, largest observed is 39.6mm x 24.6mm. The shell is heavy with slightly convex sides & a short spire. It has a greenish ground colour, occasionally yellowish or almost black, but constantly marked with fine spiral dark brown lines which are strongest at midbody and there are usually several white blotches around the midbody. The suture is well marked and the spire greenish with a few white blotches and very weak spiral grooves. The aperture is blue with a very dark narrow zone near the lip. The animal is very dark green, almost black, and lies in shallow water from low tide to 3m, under or amongst rocks. It has been recorded from Gatos and Sal-Rei Bays, Boavista Is.

Conus iberogermanicus. Dimensions: length 18-30mm, width 11-17mm, largest observed is 37.0mm x 21.5mm. The shell has a gently convex profile, a moderately high spire also with a convex profile and well marked suture, and is blue to blue-green with the anterior end brown. There are 2-3 white or yellowish narrow spiral bands on the body whorl and its anterior portion is sculptured with 5-8 conspicuous grooves, while the other whorls are green with a number of extremely thin spiral striae seen under magnification. The aperture has a light blue interior which is darker towards the thin, straight lip, and the white bands mentioned above are much more obvious inside the aperture. It is found only at Sal-Rei, Boavista Is. The animal is dark and similar to C.crotchii, with which it lives sympatrically.

Conus grahami grahami (Plate 24). Dimensions: length 17-28mm, width 10-15mm. This is a vermivorous cone (feeds on worms) with a small, bulgy, highspired dark olive green shell. The body whorl is convex and has a rounded shoulder and a smooth surface apart from some weak spiral cords at the anterior end. The spire whorls have white dots on a green background, and 3-5 obvious spiral grooves. The olive green colouration is interrupted by 2 spiral rows of irregular white spots forming a variable pattern on the body whorl which also has many inconspicuous dark spiral lines. The aperture is light whitish violet with two white spiral bands, one at midbody and the other at the shoulder. The animal is dark greenish violet and lives under stones on sand, or on the undersides of rocks in 0.8-2m depth. It is found at Calhau Bay, St Vicente Is.

Conus grahami pseudorentricosus: A distinct population which is found at Francisca Beach, S.Lucia Is. The colour is blueish white, with yellow to dark olive green spiral zones, and the entire surface of the body whorl is covered with very fine spiral lines consisting of white and dark dots. The aperture is dark violet, with white bands at the shoulder and midbody regions. The body whorl is heavily inflated and has convex sides, giving the shell a broad appearance. The spire whorls show three strong spiral grooves. This subspecies lives on a sandy bottom and differs from C.g.grahami in both shape and colour. The name "pseudoventricosus" reflects the relationship with C.ventricosus, a Mediterranean species.

Conus grahami longilineus. Another separate population, found at Parda and Serra Negra Bays, as well as in Ninto de Guincho on Sal Is. These specimens are smaller and more elongated, with a pattern of five white dots on a light green background, and the animal is a pale grey. The strongly elongated shape and very fine pattern separate this from the other two subspecies.

Conus grahami is related to the Mediterranean C.ventricosus, but readily distinguished by size, pattern and colour. Also the structure of the egg capsubs differ, those of C. grahami being oval with four longitudinal ridges on the convex side. These capsules are attached to the undersides of rocks in flat spawn masses, instead of being glued on top of each other.

Conus damottai. Dimensions: length 12-24mm, width 8-14mm. A small, broad shell, smooth apart from a few grooves at the anterior end. It is convex with a white to blueish ground colour and covered with irregular large brown-green blotches. Over these blotches are several continuous or interrupted brown lines. The spire is lightly coloured, moderately high and more or less straight, with brown undulating lines, and the whorls have conspicuous fine spiral striae. The aperture is thin, slightly convex, and dark purple with two white bands corresponding to the external colouration of the shell. The interiro edge of the lips is white. The periostracum is thin, semi-transparent and yellowish. This species has been collected at Gatas Bay, Boavista Is, from 0.5-3mm deep on live corals and under large rocks. The animal is dark grey. The small size, broad shell & distinctive colouration separate it from other related species.

Conus Maruchae. Dimensions: length 8-12mm, width 5-7mm, largest observed is 12.7mm in length. This small shell is jet black, sometimes with an interrupted light band below the midbody region in small specimens. The shell is smooth apart from the usual anterior grooves, the shoulder is broad and quite rounded giving the shell a slightly pyriform shape, and the spire is moderately high, with atraight to slightly convex sides and 3 clearly marked spiral striae. The inner edge of the lip is black and the interior is blue with some deep violet zones. It has been collected at Baiona, Sal Is, near high-tide mark in small rock pools. It is not the juvenile form of another species as it differs in colour, pattern, and shoulder profile from all other known Cape Verde cones. At Ponta Preta Bay, Sal Is, and Saragasa, S. Vicente Is, two other populations have been found which could also represent this species.

5. The "cuneolus" complex, containing 5 species: Conus cuneolus Reeve 1844; C.pseudocuneolus Rockel, Rolon & Monteiro 1981; C.salreiensis Rolon 1980; C.verdensis Trovao 1979; and C.roeckeli Rolon 1980.

Conus cuneolus. (Plates 15-23, 25-26). (Synonyms: C.anthonyi Pehich 1975; C.delanoyi Trovao 1979). Walls (1979) placed this species as synonomous with C.balteus Wood, but the original illustration and description of C.balteus is insufficient, as it could easily apply to several other species, e.g. C.sponsalis Hwass. It is better therefore, to retain the name C.cuneolus for the Cape Verde specimens. To add to the confusion, Walls (1979) did not illustrate this species in his plate on page 144, which shows four specimens of C.decoratus. Conus cuneolus is one of the most widespread and common species in the Cape Verde Islans, and probably also one of the most variable. At least 13 reasonably distinct forms can be recognised. Consequently, it is difficult to give a general description, but it is a small species, up to 30mm in length, the shell is smooth except for a few grooves at the anterior end. The shoulder is not coronated, and the spire is rather flat to moderately high, often eroded, and is slightly concave. The lip is thin and straight, with the aperture white to blueish. The animal is always dark, ranging from grey to green or red and lives on a rocky bottom, mostly in rock crevices, from 0.5-4m deep. The 13 forms are described in some detail in "Cone shells from Cape Verde Islands", so only a brief account of each is given here:

Form A: Algodoeiro & Mordeira Bays, Sal Is. Colour formed by countless narrow axial lines on white, which form wide spiral bands. Anterior lip light brown, spire moderately high (Plate 21).

Form B: Gatos Bay, Boavista Is. This is the form described as C.delanoyi, but is very close to Form A above. White with an intricate reticulated pattern. Anterior lip brown, spire moderately high.

Form C: Santa Maria Bay, Sal Is, and occasionally in Algodoeiro Bay. Lighter colour than Form A, often with a blueish ground colour and well defined light spiral bands (Plate 16).

Form D: Serra Negro Bay, Sal Is. Much smaller & lighter, with a blueish ground colour. Reticulated pattern, similar to the preceding forms. Spire is higher than any other forms and resembles somewhat C.anthonyi as described by Petuch from the island of S.Tiago (Plate 19).

Form E: Saragasa, S.Vicente Is. Similar to Form A, but more elongated and with uniform brown bands and fine reticulation on a white background. (Plate 18).

Form F: Parda Bay, & Pedra de Lume Bay, Sal Is. A small, dark green shell with 2 brownish narrow bands - one at midbody and one at the shoulder. Moderately high, concave, spire.

Form G: Mordeira Bay, Sal Is. Close to Form A with a pattern made up of numerous irregular spiral bands, but these are interupted forming 1-3 bands of vaguely triangular white blotches. General colour of shell is yellowish or orange to greenish. Spire always rather low. (Plate 15).

Form H: Fontana Bay, Sal Is. Similar to Form G, but it usually has several broad or narrow light or dark spiral bands. No white blotches are present at all (Plate 20).

Form I: Rigona Bay, also occasionally Palmeira, Ponta Preta and Baiona Bays, Sal. Is. Shell brown with a spiral dark brown band near the shoulder and another near the anterior lip. Region between is lighter, with numerous dark brown very thin irregular axial lines. Spire moderately low (Plate 22).

Form J: Matiota Bay, S. Vicente Is. Shell small, very dark brown to black, with 2 narrow interupted yellow-white bands. Anterior lip often with some white dots. Spire moderately high (Plate 23).

Form K: Porto Novo, San Antao Is. Mideium sized shell, very dark brown or black, with many small white dots over the entire body whorl. Spire moderately high & slightly concave. (Plate 25).

Form L: S. Nicolau Is. Similar to Form K, but not so dark, in fact chestnut brown, with many conspicuous black spiral lines all over the body whorl. These black lines are interupted by white dots (Plate 26).

Form M. S. Tiago Is. Entirely reddish brown, though smaller specimens have a faint band of lighter dots. (Plate 17).

Although many of these forms are rather extreme, intergrading between them has been found, but in other instances the links are not so obvious.

Conus pseudocuneolus. Length 30mm, width 11-18mm. A moderately large and variable shell. Most specimens are very dark, with a paler band at midbody, crossed by many dark brown axial wavy lines. The remainder of the body whorl is covered by a dark brown layer and is smooth except for some spiral grooves near the anterior end. The spire is moderately low, slightly concave and the whorls are spirally striated. The aperture is purplish blue to purplish white with a thin, straight edge. The animal is pale grey. It lives at depths of 0.5-4m among and under rocks, usually well hidden. It occurs at Serra Negra and Parda Bals, Sal Is where it co-exists with C.cuneolus, without intergrading.

Conus salreiensis (Plate 14). Length 13-22mm, width 6-14mm; largest observed specimen 28.4mm x 16.6mm. The shell is of medium size, with a rounded shoulder, moderately low, concave spire, and the spire whorls have 3 spiral striae. The body whorl is smooth except for the usual grooves near the anterior end. Colour pattern is fairly constant; anterior tip of body whorl is very dark brown, almost black, and another zone of the same colour occupies the posterior zone of the body whorl, extending over the entire spire. Between these 2 dark zones is a paler coloured region, occasionally with one or more dark brown, narrow spiral bands, but always covered by countless axial wavy lines. The aperture is pale, sometimes purplish. The periostraceum is thin, and the animal dark red to black. It is found in Sal Rei, Boavista Is, living on algae covered rocks, 1-3m deep. It may co-exist with C.crotchii and C.josephinae. This species is illustrated by Walls (1979), p.648 top right picture, under the name C.taslei, erroneously, since this is a valid species from West Africa.

Conus verdensis (Plate 5). Length 15-20mm, width 9-12mm. A moderately small shell, straight and smooth (except for anterior grooving) and shiny with a rather broad rounded shoulder. It is dark brown to black with several dirty white axial irregular bands but the anterior lip and shoulder are devoid of these white markings. The spire is low, slightly convex, has 4-5 spiral striae, and is dark with some whitish blotches. The aperture is whitish and the edge of the lip dark.

The periostracum is thin and yellowish and the animal dark red to brown. It has been recorded from the islands of Santa Luzia, Santo Antao, S.Vicente & Santiago, but the authors have found it only on Santiago, at Tarrafal & Marique Bays. It lives on algal covered rocks, sometimes buried in sand patches, between 0.5 and 2m depth.

Conus roeckeli (Plate 13). Length 10-25mm, width 5-15mm; largest observed specimen 31.6mm x 18.6mm. A small shell, straight-sided, with an angular shoulder and a straight-sided moderately low spire. The spire whorls have a well-marked suture & 3 spiral striae. The aperture is light violet, with 2 whitish bands, one at mid-body and one at the posterior end. The shell colouration is very variable, some have irregularly alternating light brown & white blotches which are more marked towards the shoulder and around midbody, while other specimens have fine axial lines, quite noticeable in the spire, and the central portion of the body whorl is a pale green. The periostracum is very thin, yellowish, and semi-transparent, and the animal is dark. This species is found under large rocks, occasionally under algae, between 2 & 5m deep. It occurs at Gatas Bay, Boavista is on the shore facing the sea and never in the more sheltered and calmer waters.

Some concluding Comments:

Generally speaking, it has long been recognised that cones from the Cape Verde Islands are not easy to obtain. There are several reasons for this -

1. Many species are endemic to the islands, or even to a single island.

2. Their distribution on each island is extremely restricted, in some cases to a couple of kilometers, or perhaps only a few hundred meters, of coastline.

3. Within their known ranges they are hard to collect because they often have low population densities and they occupy difficult habitats. They tend to be camouflaged by their colour pattern, are often covered by calcareous deposits, or live buried in sand and under stones.

The calcareous deposits must be removed before display (and often before positive identification) which is both time consuming and often damaging to the shell. In some species, perfect specimens are unobtainable, as the adults always have eroded spires.

The Republic of the Cape Verde Islands is not a tourist mecca, being mostly desert, lacking good hotels, internal transportation, roads are primitive, cars scarce and rental boats uncertain. Therefore, only the most dedicated people go there to pick up cones! For biological reasons, e.g., small isolated populations, limited habitats, slow growth rates, etc., several species are in danger of extinction. Any new harbour excavation for instance could have serious consequences. This would particularly apply to Conus grahami grahami, C.g.pseudoveniricosus, C.ateralbus, and C.borgesi. The Cape Verde authorities have been alerted to the above dangers; lets hope that they take steps to protect the endemic malacological fauna which represents a unique natural heritage and should not be permitted to disappear.

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FIGURE CAPTIONS

1. Conus ermineus 48mm
2. C. genuanus 35mm
3. C. tabidus 35, 30mm
4. C. venulatus (form A) 53mm
5. C. verdensis 20mm
6. C. ateralbus 36mm
7. C. crotchii 29mm
8. C. trochulus 36mm
9. C. decoratus (form A) 23mm
10. C. venulatus (form C) 45mm
11. C. josephinae 21mm
12. C. decoratus (form B) 27mm
13. C. roeckeli 24mm
14. C. salreiensis 25mm
15. C. cuneolus (form G) 21mm
16. C. cuneolus (form C) 23mm
17. C. cuneolus (form M) 15mm
18. C. cuneolus (form E) 15mm
19. C. cuneolus (form D) 12mm
20. C. cuneolus (form H) 18mm
21. C. cuneolus (form A) 21mm
22. C. cuneolus (form I) 16mm
23. C. cuneolus (form J) 17mm
24. C.grahami grahami 20mm
25. C. cuneolus (form K) 20mm
26. C. cuneolus (form L) 21mm

TRIP TO MAHIA PENNINSULA, EASTER WEEKEND 1983

E. Scott

Six members of the club (Jill Burnett, Peter Jameison, Jenny Raven, Eric Scott and Meg & Norm Taylor) spent Easter shelling around the Mahia Penninsula. The following is an account of that memorable trip.

DAY ONE

Those of us travelling by rental car reached Mahia at 2.30pm after a most enjoyable trip, quickly unpacked and set off in search of a good shelling spot on the west side of the Penninsula. After a half-hour drive over a rough road (ideal rental car conditions) we reached Moemoto Bay. The tide was perfect (0.0m) with an offshore wind and it wasn't long before we began collecting live Buccinulum colensoi, B. lineum, Pholadidea spathulata, Penion sp, and Cookia sulcata. The rock was soft, presumeably a type of papa, which was ideal for good specimens of Cellana flava (with exquisite jet-black markings), Guildingia obtecta and Sypharochiton pelliserpentis.

Peter and I decided to venture a little further afield and found a cave through a jutting headland which appeared to be negotiable only at low tide. While looking around the cave and a cavern on the other side of it, we came across the largest Notoacmea pileopsis we had ever seen (up to 34mm long). The higher up the cave walls they were, the larger they became but, as always, the biggest were out of our reach, well up into the splash zone. We decided to leave them for another day when we could return better prepared.

On the way back to camp we stopped for a quick foray into the bush looking for land snails. The whole area was extremely dry, even leaf litter lying in an old river bed contained any moisture. However, we filled a couple of bags with what looked to be the best litter we could get. When we reached the car, we found we had a puncture (reinforcing my earlier comment). We finally reached camp around 6.30p.m. where we met Meg and Norm and settled down to a night of cleaning up specimens and playing cards.

DAY TWO

This was a day of disappointments. We rose early to get a good start but hadn't counted on "local time" (½ hour local time to fix a puncture = 2½ hours normal time). We eventually reached Mahanga Beach but there had been no recent washups so pickings were slim, although an Alcithoe fusus was collected. The same occured at Oraka Bay at the mouth of the Maungawhio Lagoon, although this spot would be most interesting after a storm judging by the remains of Resania lanceolata, Lithophaga truncata, Maurea selecta and Alcithoe fusus. We moved on to Cemetary Point where we had lunch. The tide was not low enough for live collecting so we drove towards our real objective of the day - Ahuriri Point at the very tip of the penninsula. After a long drive through spectacular countryside we came to a little settlement at the end of the road, but to get to the coast we had to go through private property. Unfortunately entry was refused, apparently the owners had had problems with strangers in the past collecting shellfish. Bitterly disappointed we turned back and eventually headed off down another road which took us out about four miles south of Table Cape. By this time the tide was low and a large

rocky reef was exposed. Collecting here was good with very large Diloma zelandica and Nerita melanotragus being found along with beautifully coloured Amaurochiton glaucus (blue), Mayena australaisie Guildingia obtecta, and various limpets.

To lift our spirits we decided to cap off a largely disappointing day with dinner at the local pub.

DAY THREE

After a slight "sleep-in" and a brush up on some of the shells we should encounter around Mahia, we drove to Cemetary Point. This was our most successful day. We could find nothing unusual living, so we started to look through shell sand, which was an exciting and interesting pastime. Broken Trivia merces, Fossarina rimata and Thoristella oppressa were collected, none of which is found in the Wellington area, and then the jackpot - 3 complete Trivia merces! It made the day for those that found them.

After 5½ hours of successful fossicking we headed off to Moemoto Bay to get "those" large elusive limpets. I must admit I was rather dubious about negotiating the cave with an onshore wind and not-so-low tide, but when Peter sets his mind to collecting something, one simply has to follow. He was, of course, successful and collected several using a knife strapped to the end of a long pole.

DAY FOUR

We headed home at 8.30a.m. stopping at various places to collect land and freshwater snails. The first stop was at Lake Tutira where we found 4 species of freshwater snails, all of which were extremely common living on the weed at the lake edge. Our next stop was Tangoio Forest where Peter and I climbed down a bank to a creek to search for small land snails in piles of loamy soil and litter. Collecting was good with 36 species found. The final stop was at the eastern end of the Manawatu Gorge for more land snails. The collecting wasn't quite so successful this time, possibly because we spent too much time avoiding native stinging nettle! We finally reached home around 6.30p.m. after a 2½ hour drive from Waikanae - a result of the homeward-bound Easter traffic.

The following is a list of species that were collected from each locality. (* = live taken; ≥ = more southern record than reported by Powell; ? = unsure species identification).

BIVALVIA	Moemoto Bay	Mahanka Beach	Oraka Bay	Cemetary Point area	Table Cape area	Mahia Bush Res.	Tangoio Forest	Manawatu Gorge
Acar sandersonae				x				
Anchomasa similis	x		x		x			
Aulacomya ater maoriana				x	x			
Barbatia novaezealandiae			x	x				
Borniola reniformis				x	x			
Cardita aoteana	x			x				
Chione stutchburyi		x	x		x			
Chlamys zeelandena				x				
Chlamys zelandiae	x		x	x				
Corbula zelandica	x			x	x			
Costokidderia costata				x				
Crassostrea glomerata	x							
Diplodessta globus	x			x				
Diplodonta striatula	x			x				
Divaricella huttoniana				x				
Dosinia anus		x	x					
Felaniella zelandica				x				
Gregariella barbata				x				
Hiatella arctica	x			x	*			
Kellia cycladiformis	x			x				
Lasaea rubra hinemoa				x				
Leptomya retiara	x			x	x			
Lithophaga truncata			x	x				
Mactra discors		x	x					
Mactra murchisoni			x					
Modiolarca impacta				x				
Modiolus areolatus	x		x	x				
Myadora antipodum				x				
Mylitta stowei	x			x	x			
Mytilus edulis aoteanus			x	x				
Neolepton antipodum				x				
Notirus reflexus	x			x	x			

	Moemoto Bay	Mahanga Beach	Craka Bay	Cemetary Point Area	Table Cape Area
BIVALVIA (CON)					
Notopaphia elegans	x		x		
Nucula Hartvigrana	x			x	x
Nucula nitidula				x	
Offadesma angusi				x	
Paphies australis		x	*		
Paphies subtriangulata subtriangulata		x	*		
Perna canaliculus			x	x	x
Philobrya munita				x	
Pholadidea spathulata	*		x	x	x
Protothaca crassicostata				x	
Resania lanceolata		x	x		
Scalpomactra scalpellum				x	
Soletellina nitida		x			
Spisula aequilateralis		x	x		
Tawera spissa				x	
Tellina gaimardi		x	x		
Tellina liliana		x			x
Xenostrobus pulex			x	x	*
Zearcopagia disculus				x	
AMPHINEURA					
Amaurochiton glaucus	*				*
Guildingiu obtecta	*				*
Ischnochiton maoricus	*				*
Onithochiton neglectus neglectus					*
Rhyssoplax aerea aerea					*

GASTROPODA (land snails)	Manawatu Gorge	Tangoio Forest	Mahia Bush Res.
Allodiscus planulatus		x	
Charopa bianca		x	
Charopa buccinella	x	x	
Charopa chrysaugeiu		x	
Charopa "anguicula (=old streaked colensoi)"		x	
Charopa coma		x	
Charopa microrhina		x	x
Charopa montivaga		x	
Charopa pilsbryi		x	
Charopa prestoni		x	
Charopa pseuclanguicnla (= old "anguicula")		x	
Charopa serpentinula		x	x
Charopa n.sp. (= old "infecta")	x		
Cytora torquilla		x	
Delos coresia		x	
Flammulina chiron		x	
Flammulina feredayi feredayi	x		
Flammulina perdita		x	
Huonodon hectori			x
Huonodon pseudoleioda		x	x
Laoma ariel		x	
Laoma ciliata		x	x
Laoma marina		x	
Laoma serratocostata		x	
Laoma n.sp. 59		x	
Laoma sp. (juvenile)		x	
Liarea lepida	x		
Mocella etu (= old "Charopa cuputspinulae")		x	
Mocella maculatu		x	x
Omphalorissa purchasi		x	
Oxychilus celarius (introduced)		x	
Paralaoma lateumbilicata		x	x

	Manawatu Gorge	Tangoio Forest	Mahia Bush Res.
GASTROPODA 9land snails) con			
Paralaoma sp. ?		x	
Phenacharopa novoseelandica	x	x	
Phenacohelix giveni		x	
Phenacohelix perplexa			x
Phenacohelix ponsonbyi		x	
Suteria ide	x		
Thalussohelix zelandiae		x	
Therasiella neozelanica		x	
Therasiella tamora		x	
Tornatellinops novoseelandica		x	

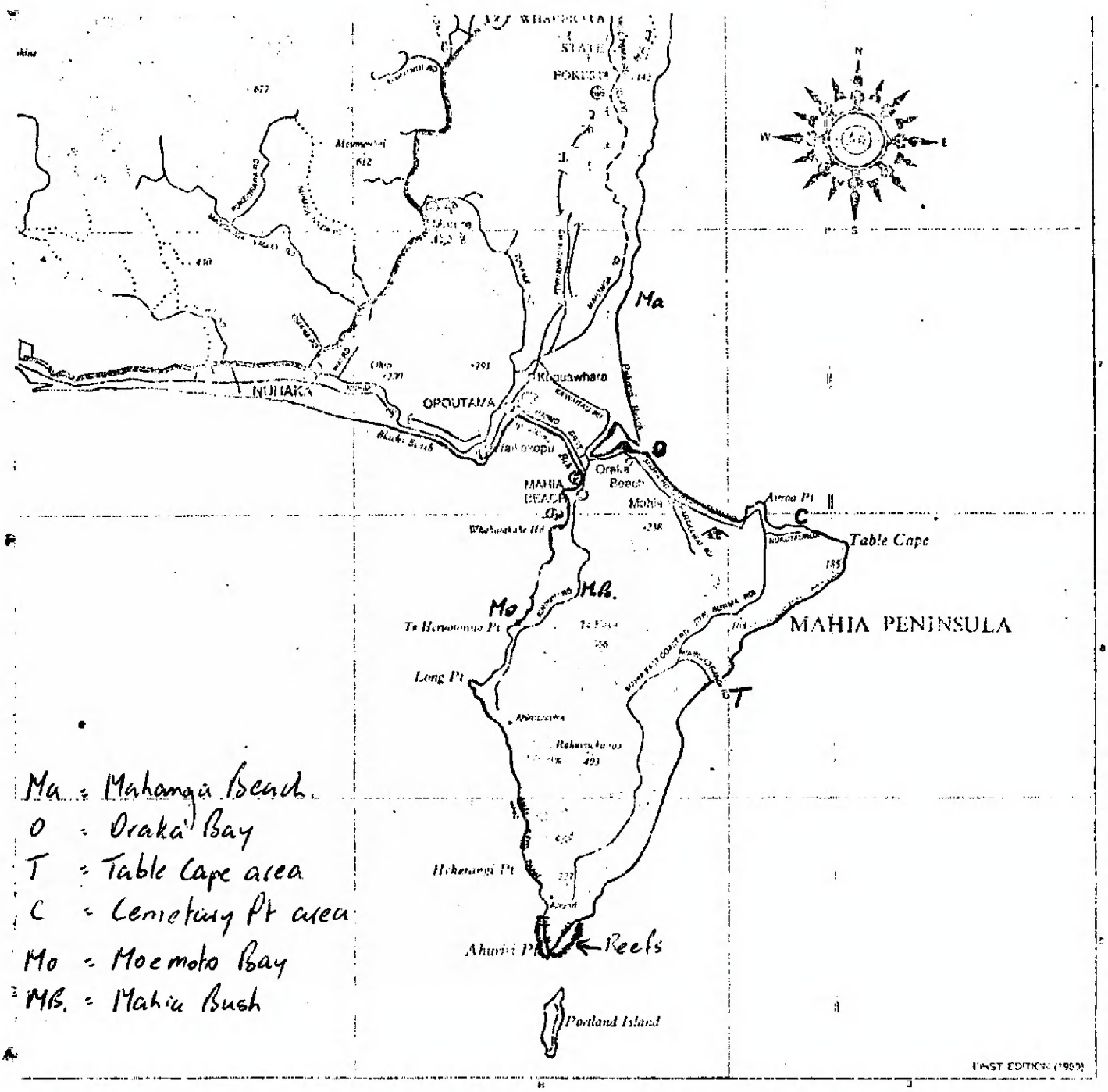
GASTROPODA (fresh water)	Lake Tutira	Moemoto Bay	Mahanga Beach	Oraka Bay	Cemetary Point Area	Table Cape Area
Lymnaea columella (introduced)	*	*				
Physastra variabilis	*					
Planorbis Kahuica	*					
Potamepyrgus antipodum	*					
(Marine)						
Alcithoe fusus fusus			x			
Amaldu australis				x	x	
Amalda mucronata					x	
Antisolarium egenum					x	
Argobuccinum tumidum				x		
Asteracmea suteri					x	
Astraea heliotropium		x			x	
Atalacmea fragilis					x	
Austrofusus glans			x	x		
Austromitra rubigmosa		x			x	
Buccinulum colensoi		*				*
Buccinulum lineum fuscozonatum					x	
Buccinulum lineum lineum		*			x	
Buccinulum pallidum pallidum						*
Buccinulum vittatum littorinoides		x				
Cantharidella tesselata		*			x	x
Cantharidus opalus opalus					x	
Cantharidus purpureus		x			x	
Cellana Plava		*			*	x
Cellana ornata		*			x	*
Cellana radians		x			x	x
Cellana stellifera					x	
Cominella adspersa		x				
Cominella glandiformis					x	*
Cominella maculosa		*			x	x

GASTROPODA (marine) contd	Moemoto Bay	Mahanga Beach	Oraka Bay	Cemetary Point Area	Table Cape Area
Cominella virgata virgata				x	*
Cookia sulcata	x	x	x	x	*
Cosa filholi				x	
Diloma arida	*				
Diloma subrostruta subrostruta	x			x	x
Diloma zelandica	x				*
Duplicaria tristis				x	
Eatoniella albocolumella				x Z	
Eatoniella huttoni				x	
Eatoniella limbata				x	
Eatoniella lutea				x	
Eatoniella olivacea				x	
Eatoniella roseola				x	
Eatoniella sp. ?				x	
Emarginula striatula				x	
Epitonium jukesianum				x	
Estea rekohuana rekohuana				x	
Estea sp. 1 ?				x	
Estea sp. 2 ?				x	
Eulimella sp. ?				x	
Fictoneba carnosa carnosa				x	
Fossarina rimata				x	
Gadinalea conica				x	x
Haliotis australis				x	x
Haliotis iris				x	*
Haliotis virginea virginea				x	*
Haustrum haustorium	x		x	*	*
Herpetopoma bella	x			x	x
Herpetopoma larochei larochei				x Z	
Janthina janthina				x	
Lamellaria ophione				x	
Lepsicella scobina scobina	*			x	*

GASTROPODA (marine) cont.	Moemoto Bay	Maharga Beach	Oraka Bay	Cemetary Point Area	Table Cape Area
Lepsithais lacunosus				x	
Leuconopsis obsoleta				x	
Linopyrga rugata rugata				x	
Littorina cincta				*	
Litterina unifasciata antipodum	x			*	x
Macrozafra nedicineta				x	
Maoricolpus roseus roseus	x			x	
Maoricrypta costata				x Z	
Maoricrypta monoxyla				x	x
Marginella cairoma				x	
Marginella mustelina				x Z	
Marginella pygmaea				x	
Maurea osbornei				x Z	
Maurea punctulata				x	
Maurea tigris				x	
Mayena australasie				x	*
Melagraphia aethiops	x			x	*
Melanopsis trifasciata				x	
Merelina lyalliana				x	
Merelina plaga				x	
Merelina taupoensis				x	
Micrelenchus dilatatus	*			x	*
Micrelenchus sanguineus sanguineus	x			x	x
Muricopsis octogonus	x			x	
Neoguraleus interruptus ?				x Z	
Neoguraleus lyallensis lyallensis	x				
Neoguraleus murdochi	x			x	
Neoguraleus sinclairi	x			x	x
Nerita melanotragus				x	*
Notoacmea daedala	*			x	
Notoacmea parviconordea				x	*
Notoacmea pileopsis pileopsis	*				

GASTROPODA (marine) contd	Moemoto Bay	Mahanga Beach	Oraka Bay	Cemetery Point Area	Table Cape Area
Notoacmea scopulina				x	
Notoscrobs semen				x	
Nozeba emarginata				x	
Oclostoma sp. 1 ?				x	
Oclostoma sp. 2 ?				x	
Ophicardelus costellaris				x	
Paratrophon quoyi				x	
Patelloida corticata	*			x	*
Paxula paxillus				x	
Penion sulcata	*		x		
Phenatoma zealandica				x	
Phillipia lutea				x Z	
Powellisetia sp.				x	
Radiacmea inconspicua	x			x	*
Risselopsis varia				x	
Rissoa hamiltoni				x	
Rissoa infecta				x	
Rissoella rissoaformis				x	
Rissoina chathamensis	x			x	x
Scrobs hedleyi				x	
Seila chathamensis				x	
Sigapatella novaezelandiae	x		x	x	x
Sinezona brevis				x	
Siphonaria cookiana				x	
Siphonaria zelandica	*			x	x
Struthiolaria papulosa			x		
Subonoba (austronoba) candidissima				x Z	
Subonoba (subonoba) sp. 1 ?				x	
Subonoba (subonoba) sp. 2 ?				x	
Tanea zelandica				x	
Taron dubius	* Z			x Z	x Z
Thais orbita	*		x	x	*
Thoristella oppressa				x Z	

GASTROPODA (marine) Cont	Moemoto Bay	Nahanga Beach	Oraka Bay	Cemetery Point Area	Table Cape Area
Triphora ampulla				x	
Triphora fascelina fasselina ?				x	
Trivia merces				x	
Trochus viridis	x		x	x	x
Tugali suteri	x			x	x
Turbo granosus	x				
Turbo smaragdus	x		x	x	x
Turbenilla sp. 1 ?				x	
Turbenilla sp. 2 ?				x	
Umbonium zelandica	x		x		
Xenophalium pyrum pyrum			x		
Xymene huttoni				x	
Xymene traversi				x	
Zaclys sarissa				x	
Zalipais lissa				x	
Zeacumantus lutulentus			*	x	
Zeacumantus subcarinatus				*	*
Zegalerus tenuis				x	
Zemitrella stephanophora?				x Z	


Ma
O
C
T
Mo
MB.
Table Cape
MAHIA PENINSULA
Long Pt
Reels
Portland Island
OPOUTAMA
MAHIA BEACH
Oraka Beach
Kiriwhara
Ma = Mahanga Beach.
O = Oraka Bay
T = Table Cape area
C = Cemetery Pt area
Mo = Moemoto Bay
MB. = Mahia Bush

B O O K R E V I E W S

A new work on the molluscs of eastern Australia came off the press in 1982. Written by Kenneth Robinson of the School of Zoology of the University of New South Wales and Philip Gibbs of N.S.W. State Fisheries, the book entitled "A Field Guide to the Common Shelled Molluscs of New South Wales Estuaries", is a useful reference work for both beginners and older collectors. It is published by the Coast and Wetlands Society, P.O. Box A225, Sydney South, 2000.

Good clear illustrations are provided, accompanied by clearly worded short descriptions of 65 species to be found in estuarine habitats. The authors have commented "the bias is towards the larger and more obvious species. Many smaller species, particularly those found in seagrass beds, are excluded because of taxonomic problems." There is also a glossary and a list of references to literature.

This is a very worthwhile book of 56 pages for all collectors having an interest in Australian shells.

The price from the publishers is $A4.50.

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Another new publication in 1982 is "Marine Shells of the Darwin Area" by H. Blackburn, published by the Art Gallaries Board of the Northern Territory. Illustrations are provided of 101 species of shells typical of the area. These are good clear coloured photos on glossy paper, the photography by J. Green of the Entomology Division of the C.S.I.R.O. The shells included in the list are not restricted to the Darwin Harbour area but are of the general area about Darwin, extending to Shoal Bay 12 miles to the north-east, and to Bynoe Harbour 23 miles to the south-west.

This is a very useful addition to the library of any collector interested in shells from northern Australia.

The price from the publishers is $A2.50.

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Cone Shells From The Cape Verde Islands.